

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

Cancel claim 1 without prejudice.  
Amend claims 2 and 3 as follows.  
Add new claims 4-37.

**Listing of Claims:**

- 1           1. (canceled)
- 1           2. (currently amended) The ~~method~~ apparatus as recited in claim  
2   + 5 further comprising:  
3           a means for dynamic management of the windows.
- 1           3. (currently amended) The ~~method~~ apparatus as recited in claim  
2   + 2 further comprising:  
3           a means for using historical values in present said windows to help  
4   populate inserted said windows.
- 1           4. (new) An apparatus for monitoring time series, comprising:  
2           one or more registers each for storing received data points of a  
3   corresponding time series;  
4           means for receiving data points of one or more time series and  
5   storing the received data points in the corresponding registers;  
6           means for receiving query strings representing queries;  
7           means for compiling the received query strings into persistent  
8   queries;  
9           at least one said persistent query, each defining a query  
10   represented by received said query strings, each persistent query being a  
11   function of the time series of corresponding one or more trigger registers  
12   of the one or more registers;

13 means, responsive to storing of a received data point in a trigger  
14 register, for evaluating each persistent query corresponding to the trigger  
15 register; and  
16 means for outputting a payload of each evaluated persistent query  
17 whose event condition has a first value.

1 5. (new) The apparatus of claim 4 wherein:  
2 at least one register comprises  
3 one or more windows each for maintaining statistics for a  
4 corresponding subset of the register's corresponding time series; and  
5 at least one persistent query is a function of one or more windows  
6 of the corresponding one or more trigger registers.

1 6. (new) The apparatus of claim 5 wherein:  
2 each persistent query defines an event condition and a payload  
3 specification of the defined query, where at least one of the event  
4 condition and the payload specification is a function of the time series of  
5 the corresponding one or more trigger registers.

1 7. (new) The apparatus of claim 6 wherein:  
2 at least one of the event condition and the payload specification of  
3 at least one persistent query is a function of the statistics maintained by at  
4 least one window of at least one of the corresponding one or more trigger  
5 registers.

1 8. (new) The apparatus of claim 5 comprising:  
2 means for performing online computation of the statistics.

1 9. (new) The apparatus of claim 4 comprising:  
2 means for dynamic management of persistent queries.

1           10. (new) An apparatus monitoring time series, comprising:  
2           means for receiving data points of one or more time series;  
3           one or more registers each corresponding to a different one of the  
4 time series, each register comprising  
5           a buffer for storing a plurality of most-recently received data points  
6 of the corresponding time series, and  
7           one or more windows, each associated with a subset of the  
8 register's corresponding time series, for maintaining statistics for the  
9 associated subset;  
10          one or more persistent queries each corresponding to one or more  
11 trigger registers of the one or more registers and defining an event  
12 condition and a payload specification that expresses data that are to be  
13 output when the event condition evaluates to a first value;  
14          means, responsive to a trigger register storing a newly-received  
15 data point, for evaluating the event condition of each persistent query  
16 corresponding to the trigger register; and  
17          means for outputting the output data specified by the payload  
18 specification of each persistent query whose event condition evaluates to  
19 the first value.

1           11. (new) The apparatus of claim 10 further comprising:  
2           means, responsive to receipt of a data point of a time series, for  
3 storing the data point in the buffer of individual said register corresponding  
4 to the data point's time series; and  
5           online computation means, responsive to the means for storing, for  
6 updating the statistics of the windows of the individual register to account  
7 for the stored data point.

1           12. (new) The apparatus of claim 11 wherein:  
2           the means for storing comprise  
3           a register basic lock;

- 4 a register booster lock;
- 5 a window lock; and
- 6 a query lock.

1 13. (new) The apparatus of claim 11 wherein:  
2 at least one of the event condition and the payload specification of  
3 at least some persistent queries are a function of the statistics of the  
4 windows of the trigger registers of the at least some persistent queries.

1 14. (new) The apparatus of claim 10 wherein:  
2 the means for receiving comprise  
3 an input for receiving a stream of data values each labeled to  
4 indicate the time series to which the data value belongs;  
5 a filter for determining from each data value's label whether the  
6 data value belongs to a time series monitored by the apparatus and  
7 discarding those data values that do not belong to a monitored series; and  
8 a sequencer for supplying a unique identification number to each  
9 filtered data value.

1 15. (new) The apparatus of claim 14 further comprising:  
2 means for storing the filtered data value accompanied by the  
3 unique identification number and a timestamp in the buffer of the individual  
4 register corresponding to the data value's time series; and  
5 online computation means, responsive to the means for storing, for  
6 updating the statistics of the windows of the individual register to account  
7 for the stored filtered data value.

1 16. (new) The apparatus of claim 10 comprising:  
2 means for adding a register to the apparatus.

1 17. (new) The apparatus of claim 10 comprising:

2 means for adding a window to a register of the apparatus.

1 18. (new) The apparatus of claim 17 wherein:  
2 the means for adding a window comprise  
3 a register basic lock;  
4 a register booster lock; and  
5 a window lock.

1 19. (new) The apparatus of claim 10 comprising:  
2 means for dynamic management of persistent queries.

1 20. (new) The apparatus of claim 10 further comprising:  
2 an input for receiving a query;  
3 a parser for parsing the query into one or more query strings  
4 corresponding to the payload specification, the event condition, and the  
5 one or more trigger registers; and  
6 means for compiling the query strings into a persistent query.

1 21. (new) The apparatus of claim 20 further comprising a query  
2 lock.

1 22. (new) A method of monitoring time series, comprising:  
2 receiving query strings representing a query;  
3 compiling from the received strings a persistent query defining the  
4 represented query as a function of one or more time series;  
5 receiving data points of the one or more time series;  
6 storing the received data points each in a register for storing  
7 received data points of a corresponding one of the one or more time  
8 series;

9           in response to storing of a received data point in a register, using  
10   contents of the register to evaluate each persistent query that is a function  
11   of the register's corresponding time series; and  
12           outputting a payload of each evaluated persistent query whose  
13   event condition has a first value.

1           23. (new) The method of claim 22 wherein:  
2           storing the received data points comprises  
3           updating statistics of any windows of the registers that store the  
4   received data points to account for the stored data points, wherein at least  
5   one register comprises one or more said windows each for maintaining the  
6   statistics for a corresponding subset of the register's corresponding time  
7   series; and  
8           using contents of the register comprises  
9           using contents of at least one of the one or more windows of the  
10   register to evaluate each persistent query that is a function of the  
11   register's corresponding time series.

1           24. (new) The method of claim 23 wherein:  
2           using contents at of least one of the one or more windows  
3   comprises  
4           using contents of the at least one window to evaluate at least one  
5   of an event condition and a payload specification of the persistent query,  
6   where the at least one of the event condition and the payload specification  
7   is a function of the register's corresponding time series.

1           25. (new) The method of claim 23 wherein:  
2           updating statistics comprises  
3           performing online computation of the statistics.

1           26. (new) The method of claim 22 further comprising:

2           dynamically managing the persistent queries.

1           27. (new) The method of claim 23 further comprising:  
2           dynamically managing the windows.

1           28. (new) The method of claim 27 further comprising:  
2           using historical values in present said windows to help populate  
3           inserted said windows.

1           29. (new) A method of monitoring time series, comprising:  
2           associating each of one or more registers with a corresponding  
3           time series of one or more time series;  
4           including in each said register one or more windows each  
5           associated with a subset of the register's corresponding time series and  
6           maintaining statistics for the associated subset;  
7           forming one or more persistent queries each corresponding to one  
8           or more trigger registers of the one or more registers and defining an  
9           event condition and a payload specification that expresses data that are to  
10          be output when the event condition evaluates to a first value;  
11          receiving a data point of one of the one or more time series;  
12          in response to the receiving, storing the received data point in a  
13          buffer for storing a plurality of most-recently received data points of the  
14          one time series, of a register that corresponds to the one data series;  
15          in response to a buffer of a trigger register storing a newly-received  
16          data point, evaluating the event conditions of each persistent query  
17          corresponding to the trigger register; and  
18          outputting the output data specified by the payload specification of  
19          each persistent query whose event condition evaluates to the first value.

1           30. (new) The method of claim 29 further comprising:

2           in response to the buffer of one of the registers storing the newly-  
3           received data point, updating statistics of the windows of the one  
4           register to account for the stored data point.

1           31. (new) The method of claim 30 wherein:  
2           evaluating the event conditions comprises  
3           evaluating at least one of the event condition and the payload  
4           specification of at least some of the persistent queries corresponding to  
5           the trigger registers as a function of the statistics of the windows of the  
6           trigger registers of the at least some persistent queries.

1           32. (new) The method of claim 29 wherein:  
2           receiving a data point comprises  
3           receiving a stream of data values each labeled to indicate the time  
4           series to which the data value belongs;  
5           determining from each data value's label whether the data value  
6           belongs to a time series monitored by the method and discarding those  
7           data values that do not belong to a monitored series; and  
8           supplying a unique identification number to each data value that is  
9           not discarded.

1           33. (new) The method of claim 32 further comprising:  
2           storing the not-discarded data value accompanied by the unique  
3           identification number and a timestamp in the buffer of the register  
4           corresponding to the data value's time series; and  
5           in response to the storing, performing online computation to update  
6           the statistics of the windows of the register to account for the stored data  
7           value.

1           34. (new) The method of claim 29 comprising:  
2           adding a register to the one or more registers.



1           35. (new) The method of claim 29 comprising:  
2           adding a window to a register to the one or more registers.

1           36. (new) The method of claim 29 comprising:  
2           dynamically managing persistent queries.

1           37. (new) The method of claim 29 wherein:  
2           forming one or more persistent queries comprises  
3           receiving a query;  
4           parsing the query into one or more query strings  
5           corresponding to the payload specification, the event condition, and the  
6           one or more trigger registers; and  
7           compiling the query strings into a persistent query.